

Delaware Options for Offshore Wind

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Presentation for

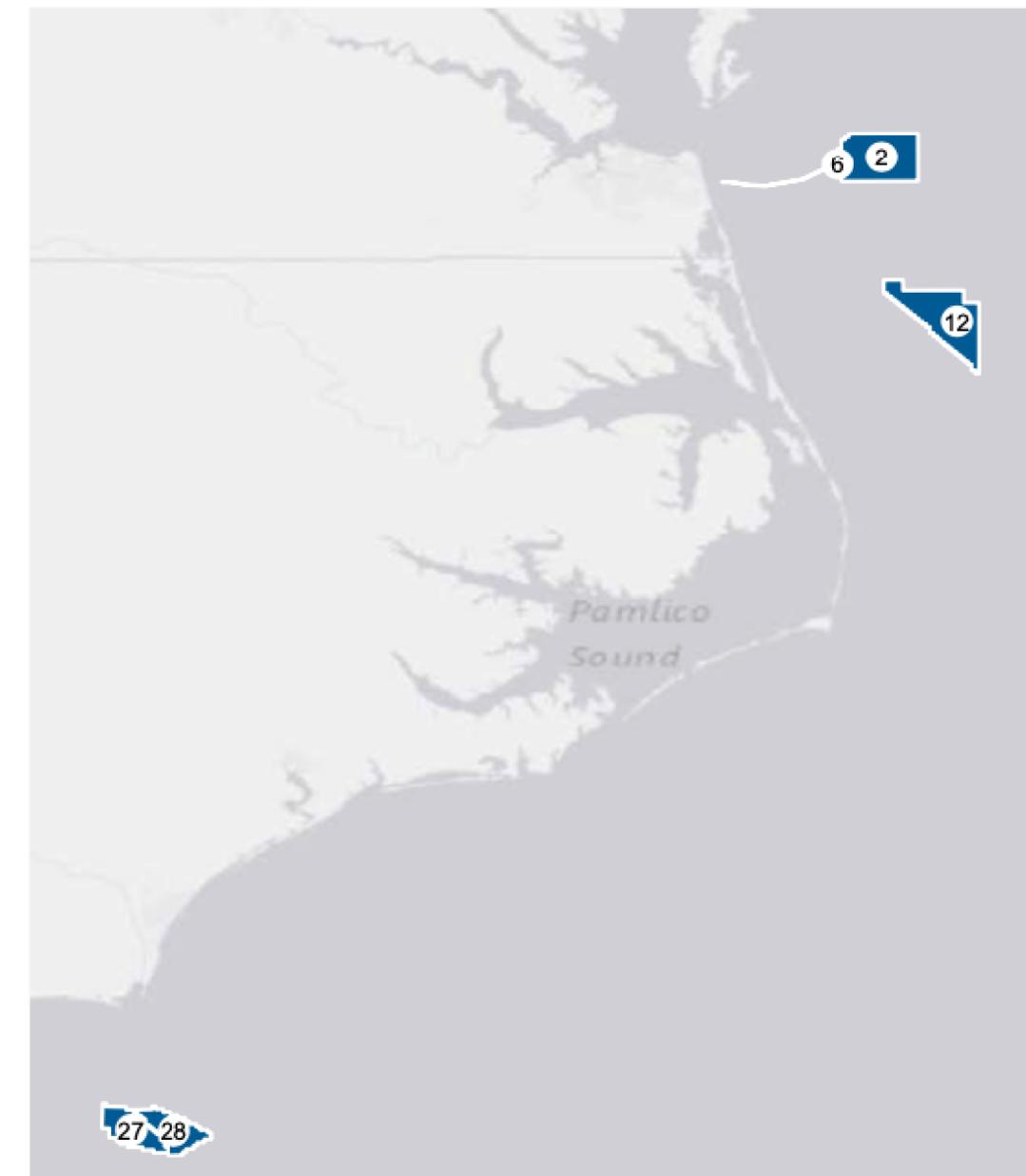
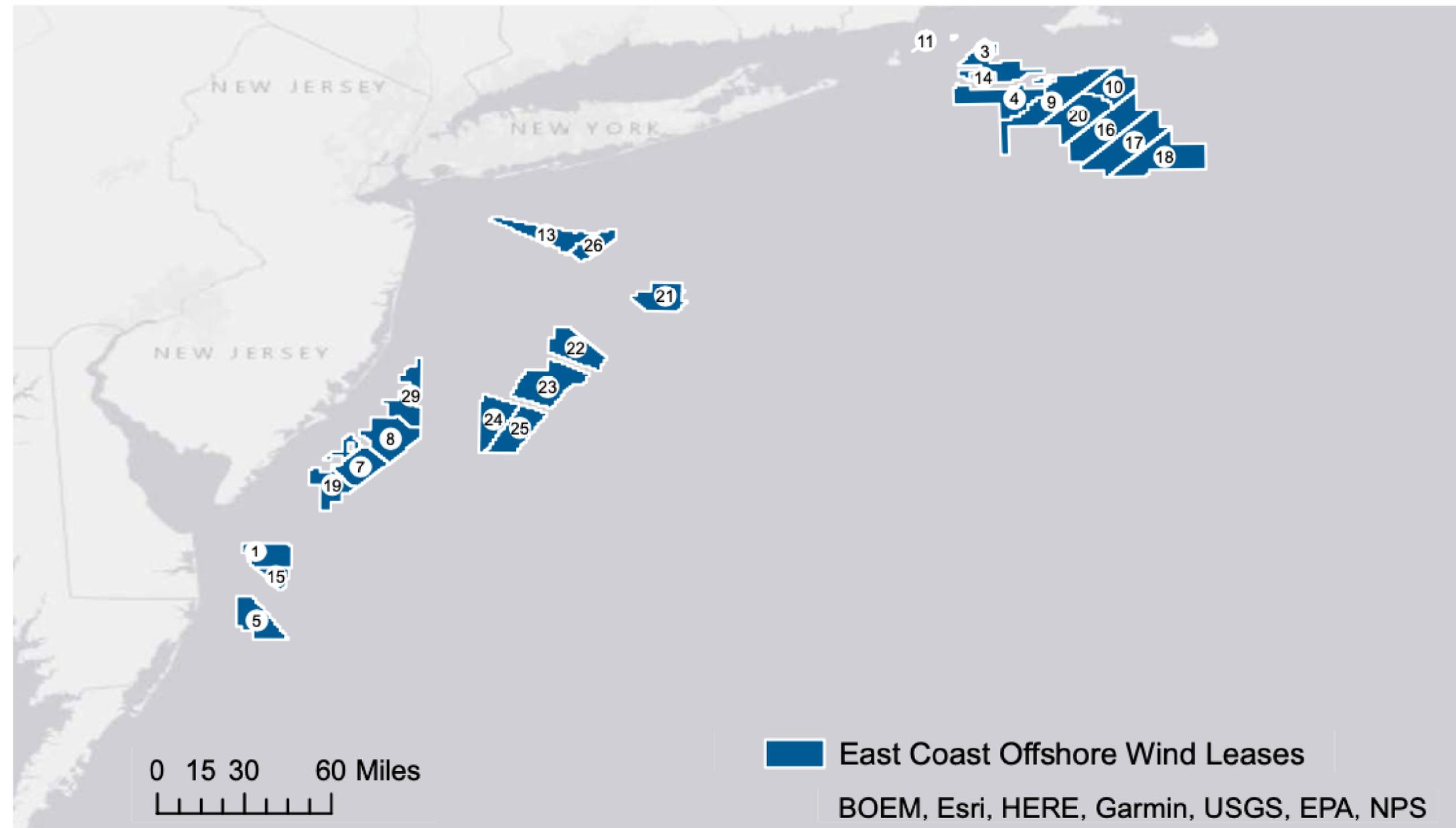
DE Governors Energy Advisory Council (GEAC)

Dover, DE

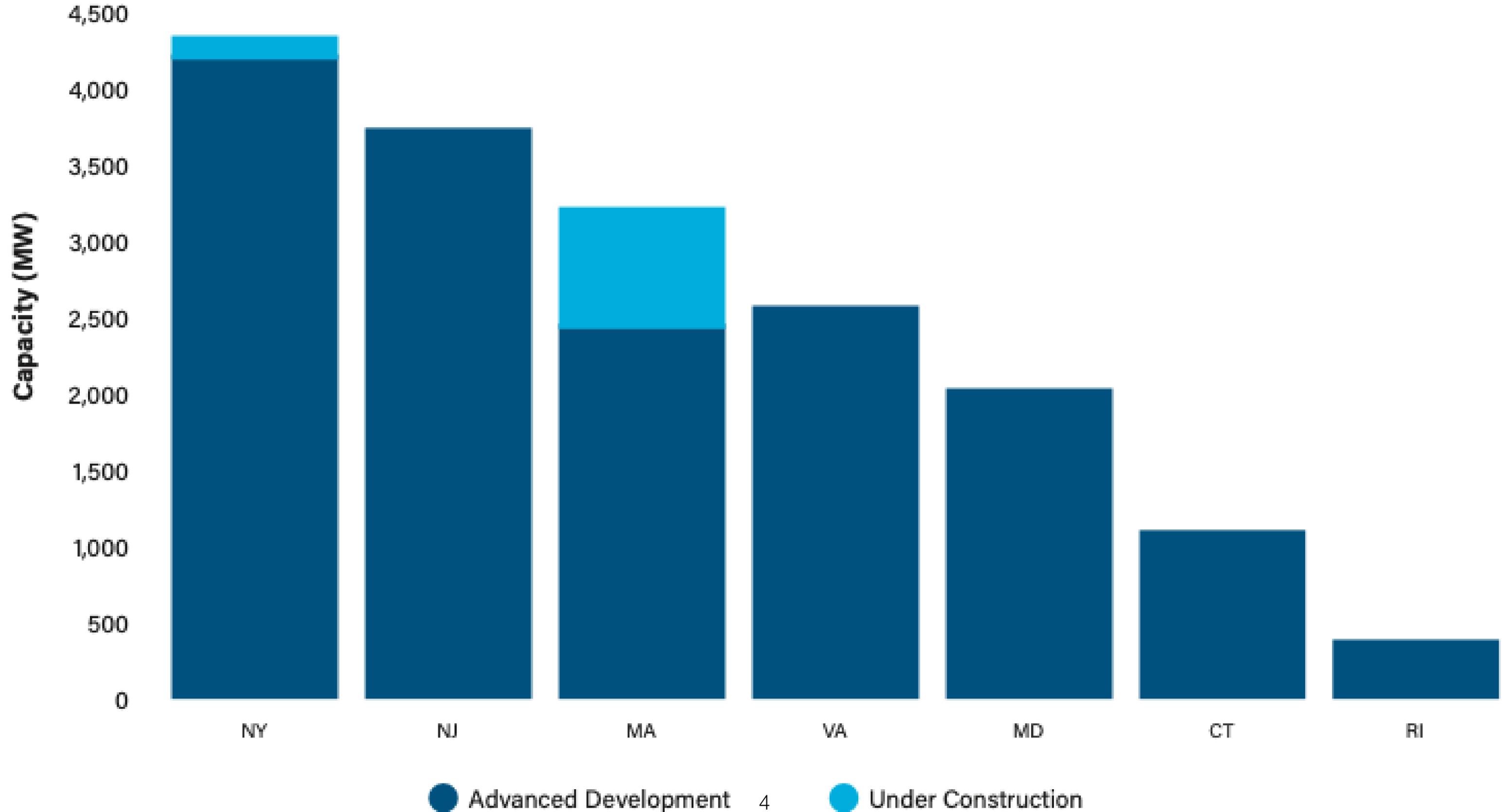
7 Sep 2023

The US Offshore Wind Industry is Already Well Underway

BOEM has already auctioned many lease areas on East Coast, each can become 1 to 3 projects



States with required OSW procurements



How could Delaware
participate?

The SLOW Report

- Estimate today's price of OSW power
- Creating a procurement process
 - State actions to reduce electricity cost
 - State actions to increase employment & new businesses
- Four coauthors, 4 advisors, 9 expert peer reviewers.
- <https://offshorewindpower.org/offshore-wind-procurement-options-for-delaware>

Offshore Wind Procurement Options for Delaware

Report to the State of Delaware by the

Special Initiative on Offshore Wind at the University of Delaware

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27 Feb 2022
Corrections 6 March 2022



Burbo Bank offshore wind farm, Liverpool Bay, England — Getty Images

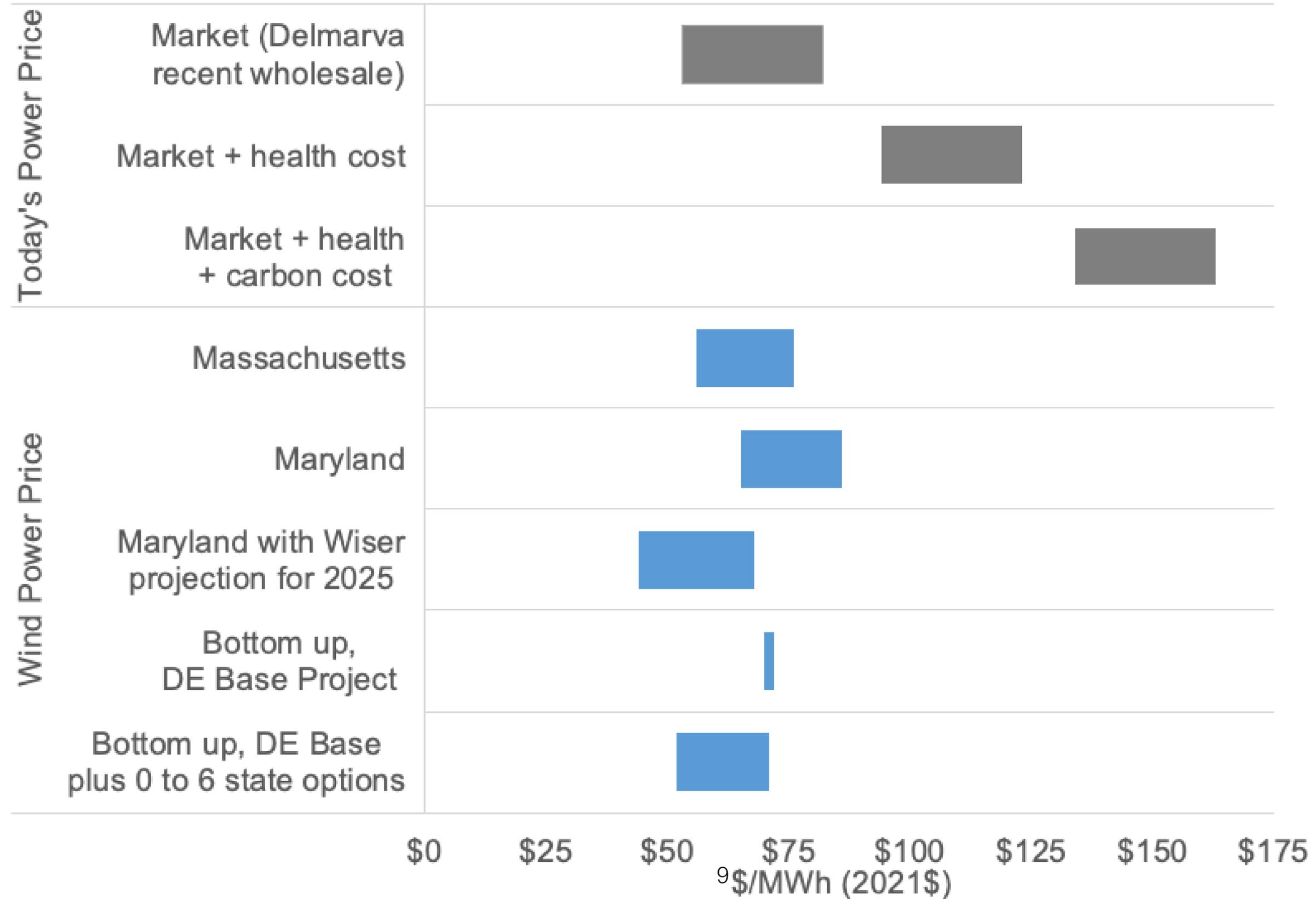
Main points from SLOW Report

- Since 2017 (DE Working Group), cost has dropped by $\sim 1/2$, due to:
 - Technology improvements, larger turbines, larger projects
 - New US factories, ports, ships, learning
- Today, OSW is in *same price range* as conventional power
 - *Assuming* procurement is done correctly
 - No need to create RECs, ORECs, or state subsidies
- To lower cost -> competition, clarify process, reduce risk, minimize delays

Comparing today's cost with OSW

- How to understand existing power cost? Calculated from:
 - Delmarva's recent power market costs
 - Compare direct cost only
 - Optionally, consider cost of health and climate damages as separate add-on
- Offshore Wind cost estimated as
 - Recent costs to other states
 - Compare with "bottom up" calculation, based on 2027 costs to estimate a Delaware project when completed

Today's power \$ versus offshore wind



Recent requests for increase in
bid prices in NE

How power price reflects cost change

- Fueled generation, e.g. natural gas, typically adds fuel cost to electricity cost
 - Thus, electricity price goes up & down over life of power contract
- For renewables, PPAs are set at bid time by the developer. Process is:
 - Developer calculates bid price by estimating future cost of materials, vessel lease, etc
 - To consumer, once bid is accepted, price is constant (perhaps with inflation escalator)
 - But developer incurs costs during construction, ~5 years after bid

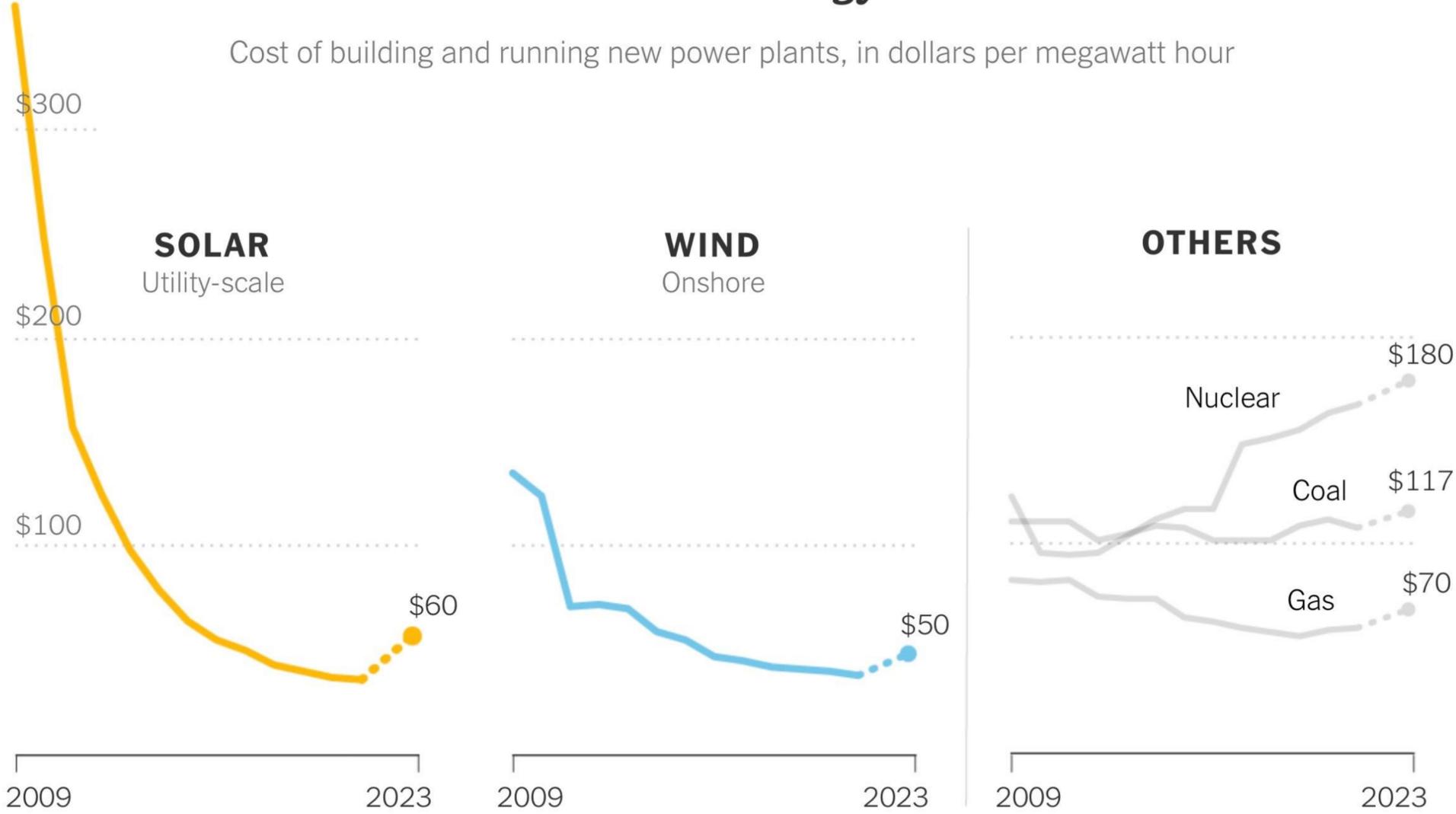
Fall 2023 Update

- What changed since NE OSW bids:
 - Post-covid inflation, supply chain shortages, invasion of Ukraine
- NYSERDA PPA filings show a time lag+inflation problem for recent solar, land wind & offshore wind
 - Offshore wind inflation price increase requests range from 26% to 48%
 - State options: accept change in bid, OR reject and fine developer for contract breach (& do another RFP later)

Renewable prices decline, with recent tic up

The Cost of Renewable Energy Has Plummeted

Cost of building and running new power plants, in dollars per megawatt hour



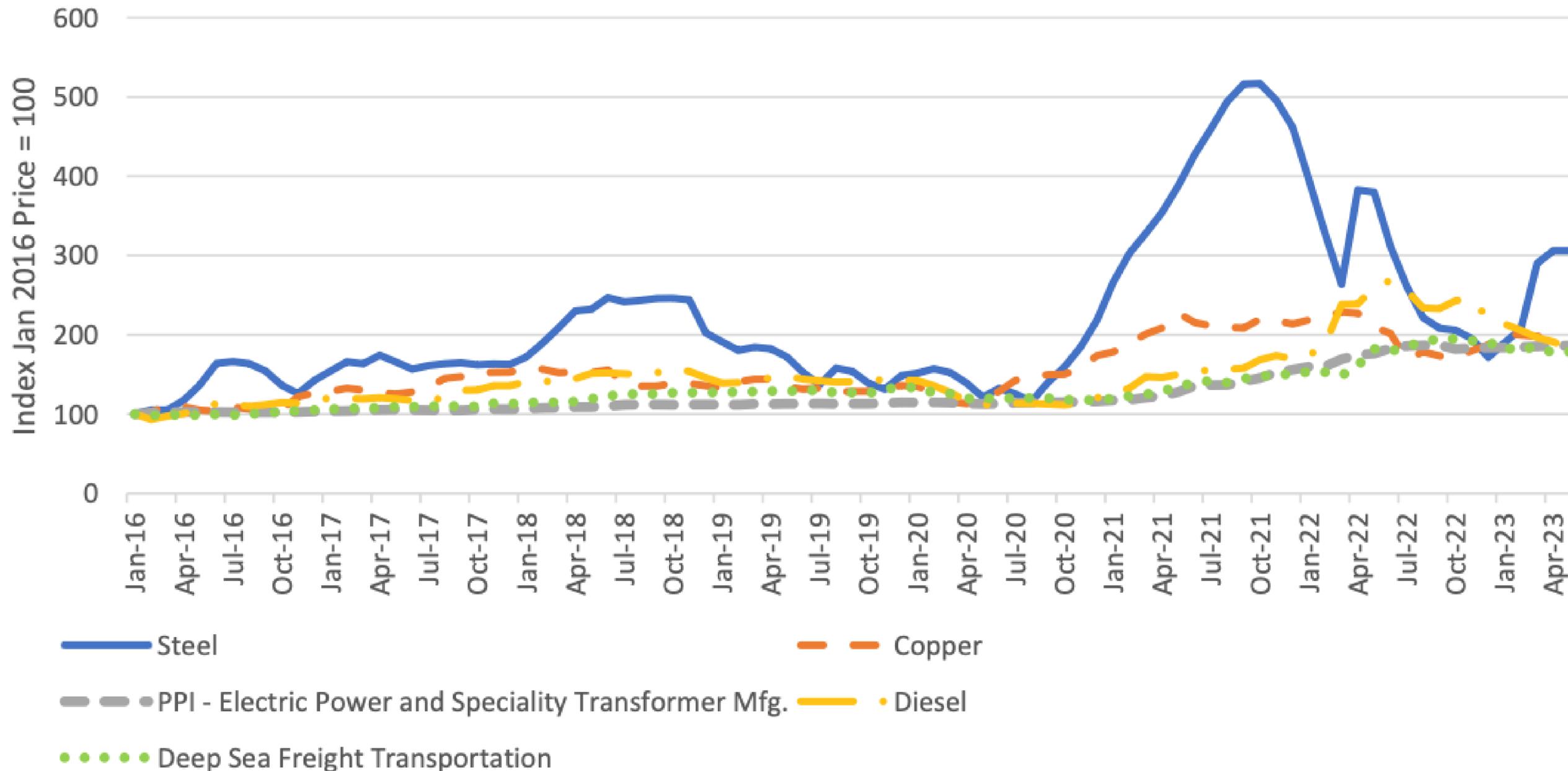
**New generation,
2009-2023, \$/MWh**

Source: [Lazard](#) • Notes: Charts reflect the mean levelized cost of energy, which captures the price of building and running new power plants but excludes other electrical system costs. Lazard did not release data for 2022. In 2023, costs rose because of supply-chain problems, inflation and other issues. • By The New York Times

Data from Lazard LCOE, graphic by NY Times, 17 Aug 2023 “The Clean Energy Future Is Arriving Faster Than You Think”

Component costs to build OSW

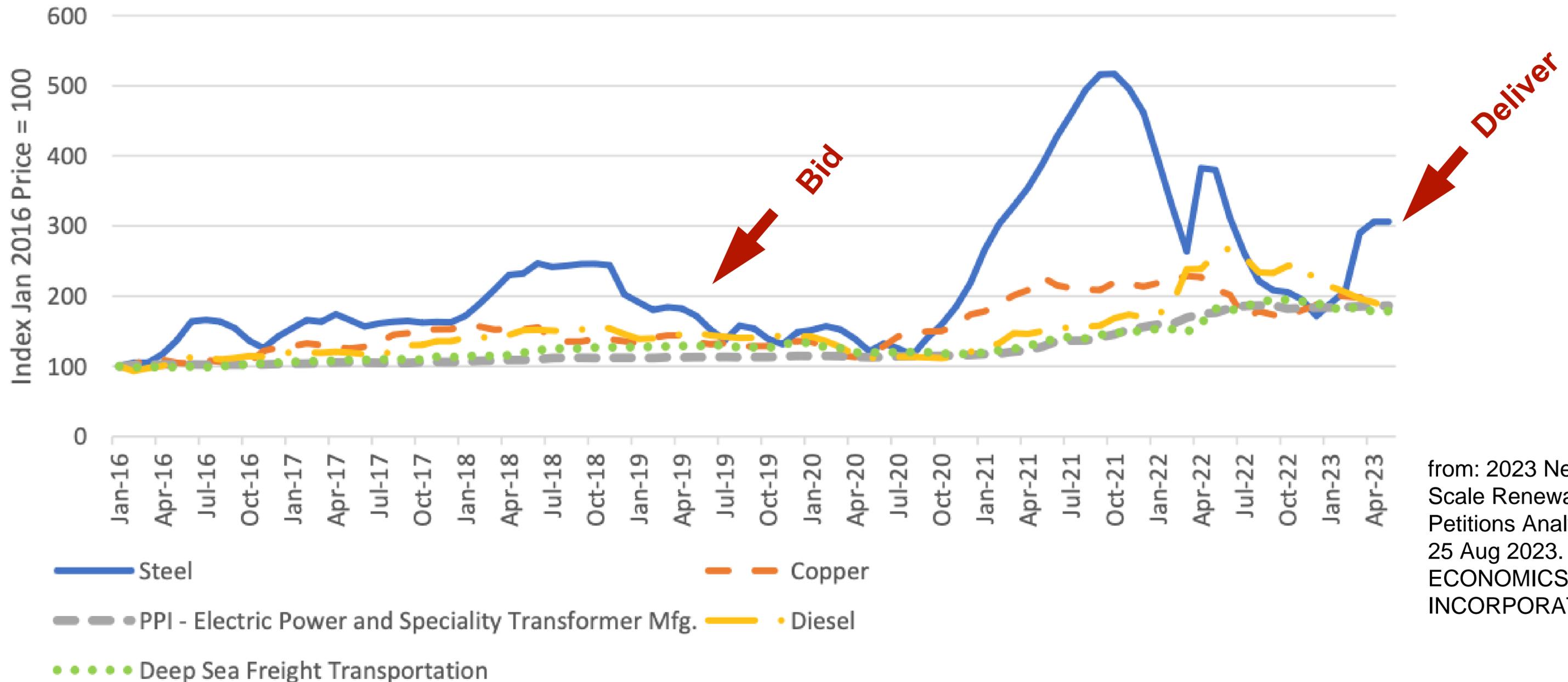
Figure 2-7. Relevant Prices Indices for Onshore and Offshore Wind Projects, 2016-2023



from: 2023 New York Large Scale Renewables Inflation Petitions Analytical Support, 25 Aug 2023. INDUSTRIAL ECONOMICS, INCORPORATED

Component costs to build OSW

Figure 2-7. Relevant Prices Indices for Onshore and Offshore Wind Projects, 2016-2023



from: 2023 New York Large Scale Renewables Inflation Petitions Analytical Support, 25 Aug 2023. INDUSTRIAL ECONOMICS, INCORPORATED

Offshore Wind, long-term cost trends

Figure 3-10. Actual and Forecasted CAPEX for Offshore Wind Projects, Annual Averages (2016-2035)

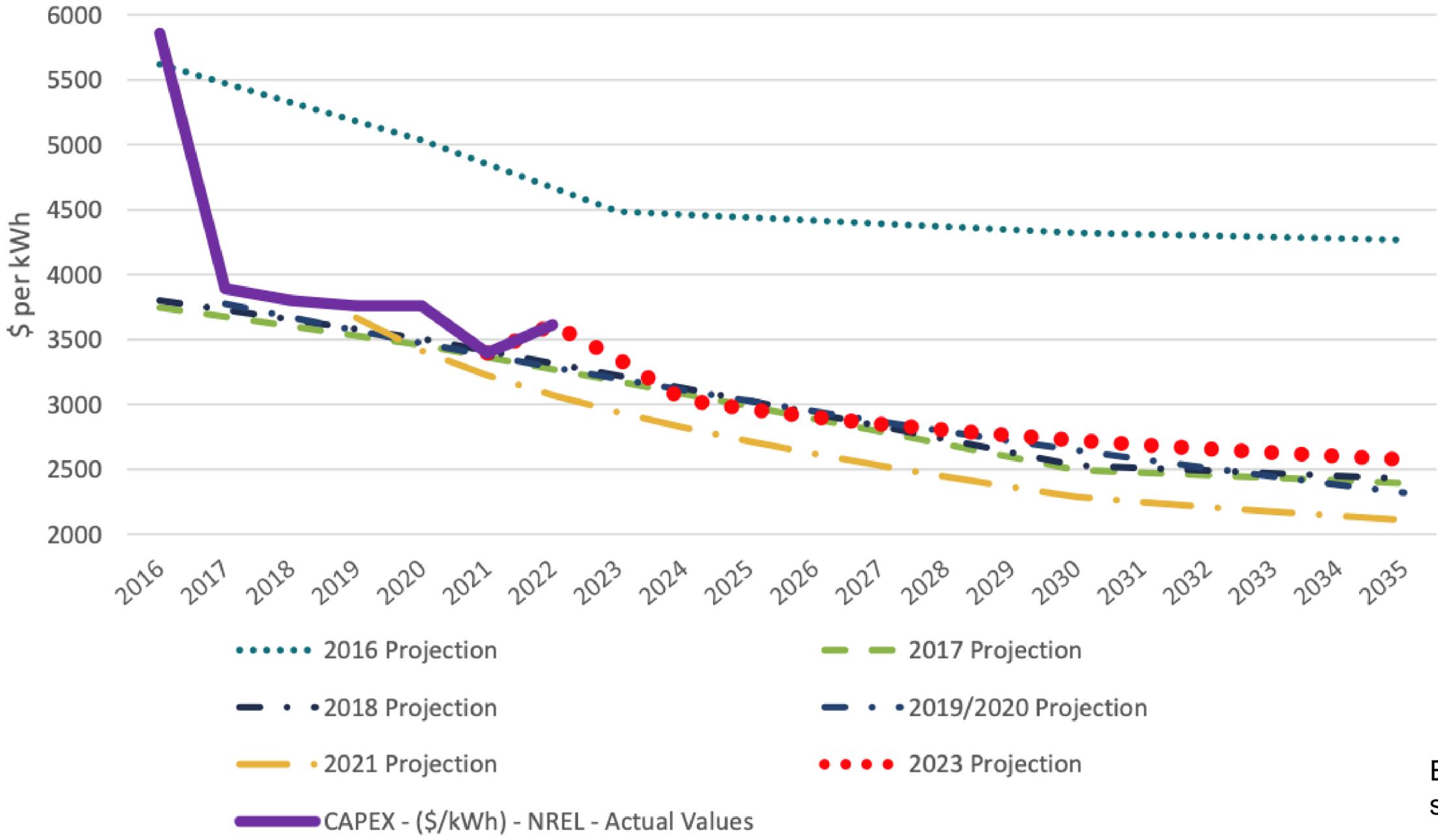


Figure from: 2023 New York Large Scale Renewables Inflation Petitions Analytical Support, 25 Aug 2023. Industrial Economics, Incorporated — Data from NREL ATB 2023.

Error in original: \$ axis and CAPEX key should be \$/kW capacity, not \$/kWh energy

DE action: steps for procurement

- State creates a procurement process, by legislation. Steps:
 - Select options to reduce cost, reduce risk and/or increase jobs
 - State issues RFP for power
 - Competitive bidding process
 - Private developers bid to sell electricity at a defined price.
 - State evaluates bids, selects winner, need not accept any bid unless favorable.
 - Utilities sign contracts to purchase electricity from winning bidders.
 - Developers build project, sell electricity.

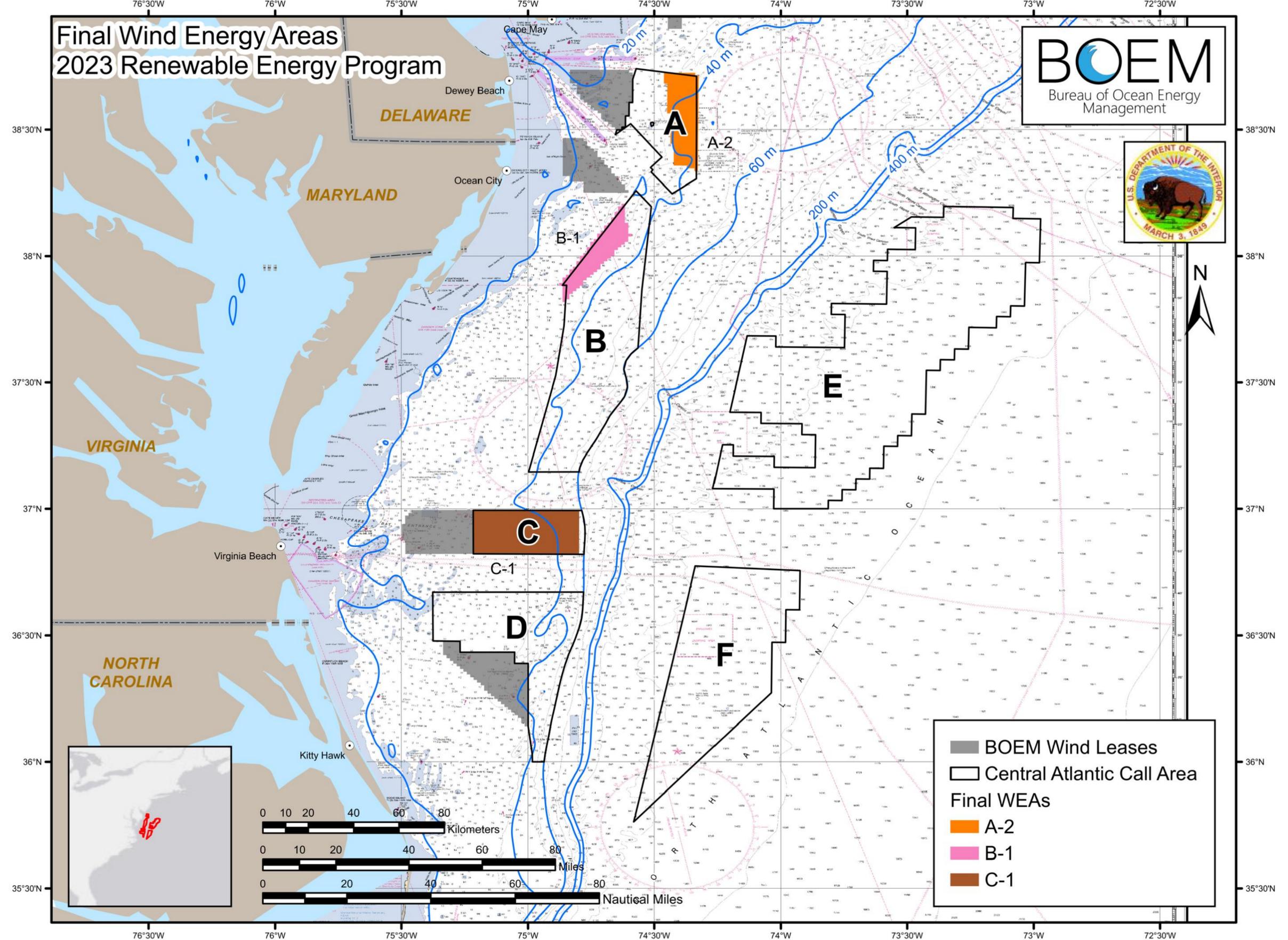
Table 8. Summary of price impacts of stat actions, relative to Base Project (two pages).

	Capital Cost Δ \$x1000 (or \$/kW if so marked)	OPEX Δ (\$x1000/year) or \$/kW/yr if marked	Change in PPA price (Δ \$/MWh), (negative is savings)	Cause of change in PPA price
Options for electricity cost reduction				
RFP for 1200 MW rather than 800 MW, in same location, compare A-800 to A-1200	- 447 \$/kW	+ 9.1 \$/kW/yr	-3.55	Only project cost tabulated; see text on other cost factors
Selected proposal is for a more distant location like Site B; compare A-1200 with B-1200, see A vs. B in Figure 4 ✖	+ 789 \$/kW	+ 3.90 \$/kW/yr	12.60	See Table 2 and discussion of B-1200
Slowdown or delays prevent developer from meeting federal ITC deadline ✖	+614,000	0	20.42	higher energy price due to lost ITC credit
Request that BOEM designate more WEAs near Delaware ✓	0	0	-3.00	more competition; assume 1% lower ROE
Defined process for cable landing that runs from the ocean, under the beach, to a substation ✓	0	0	-5.50	Less construction risk, less delay
Coordinated single 3GW transmission for 3 projects rather than one cable per project ✓	- 86 \$/kW	0	-2.30	shared single cable and converter stations, savings allocated per power capacity
Clarifications to state permitting and guidance from DNREC to avoid delay ✓	0	0	-3.40	reduce risk of development delay by 6 months

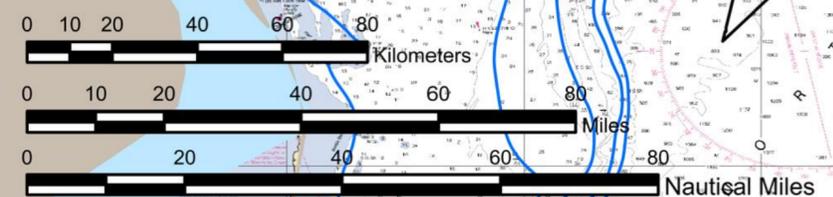
**Example from SLOW Report:
calculated cost or savings of
each procurement rule by
the state**

Central Atlantic Wind Energy Areas

Final Wind Energy Areas 2023 Renewable Energy Program



	BOEM Wind Leases
	Central Atlantic Call Area
Final WEAs	
	A-2
	B-1
	C-1



Final WEAs, July 2023

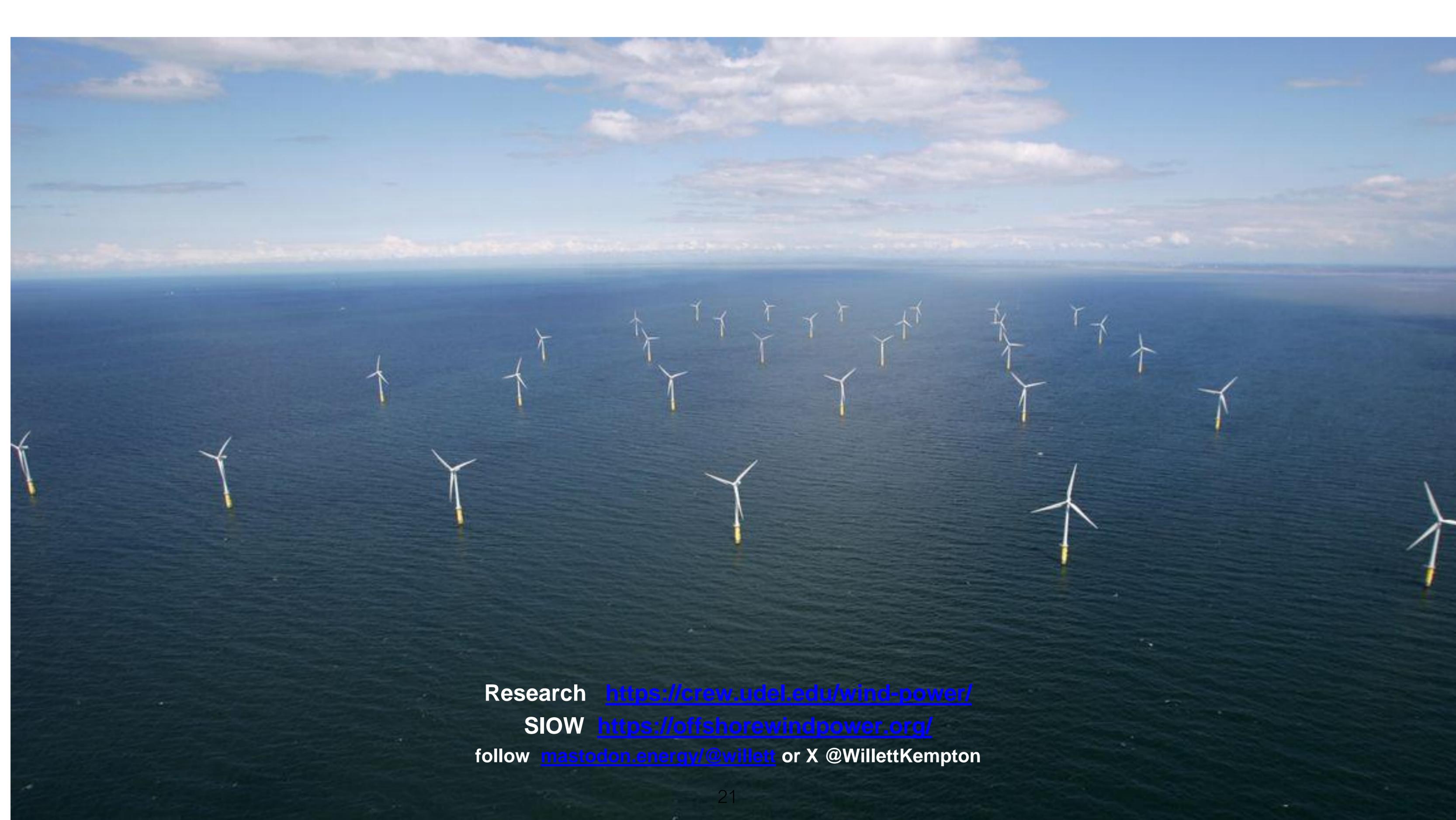
Existing leases: Gray

New areas A-2, B-1, C-1

BOEM says total is 4-8 GW

Takeaways

- DE can't meet our climate goals without offshore wind power
- OSW requires no added cost if procurement uses best practices
 - Guidelines and options in SLOW report
 - SOIW recommends no new state subsidy
 - Given possible inflation, DE should define potential cost adjustment
- Process:
 - State legislature passes procurement law, giving authority & setting rules; RFP issued
 - Developers submit bids to sell electricity
 - If price not favorable, state need not accept any bids
 - Winning developer signs contracts with utilities, builds project
- Large resource, 100B\$ regional industry developing, big CO₂ reductions possible



Research <https://crew.udel.edu/wind-power/>

SIOW <https://offshorewindpower.org/>

follow mastodon.energy/@willett or X @WillettKempton

Consultation and Review

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Earlier SLOW Reports

- New York State
 - SLOW NY report, released 2015
 - Planning process determined “NY cannot meet its climate goals without offshore wind”
 - Gov Executive Order, Jan 2017 for 2.4 GW
 - NY Legislature, 2019 law requiring 9 GW by 2035
 - NYSERDA now saying to add e-fuels NY will require > 9 GW
- Commonwealth of Massachusetts
 - SLOW MA report March 2016
 - MA Legislature, August 2016, law for 1.6 GW PPAs by 2027
 - First 800 MW begins construction early 2023
 - MA H4515 in 2022 increased to require 5.6 GW by 2027

Economic & Employment Benefits

- States buying OSW can also gain local facilities, like...
 - Worker training centers; new opportunities in a growing industry
 - O&M port ~60 jobs over 30 years, plus indirect economic stimulation
 - Marshaling port, start ~500 workers
 - Manufacturing of OSW components